11-14-1997

DDASaccident221

Humanitarian Demining Accident and Incident Database
AID

DDAS Accident Report

Accident details

Report date:	16/02/2004	**Accident number:**	221
Accident time:	09:30	**Accident Date:**	14/11/1997
Where it occurred:	Tusla-Dobaj road	**Country:**	Bosnia Herzegovina
Primary cause:	Field control inadequacy (?)	**Secondary cause:**	Inadequate training (?)
Class:	Missed-mine accident	**Date of main report:**	18/11/1997
ID original source:	WL/DD/PI/MP/CG	**Name of source:**	BiH MAC
Organisation:	Name removed		
Mine/device:	PROM-1 AP Bfrag	**Ground condition:**	woodland leaf litter, wet
Date record created:	16/02/2004	**Date last modified:**	16/02/2004
No of victims:	2	**No of documents:**	2

Map details

Longitude:		**Latitude:**	
Alt. coord. system:	GR: BQ974375	**Coordinates fixed by:**	
Map east:		**Map north:**	
Map scale:		**Map series:**	
Map edition:		**Map sheet:**	
Map name:			

Accident Notes

dog missed mine (?)

partner's failure to "control" (?)

inadequate training (?)

protective equipment not worn (?)

inadequate area marking (?)

inadequate equipment (?)

inadequate metal-detector (?)

Accident report

A Board of Inquiry report was ordered by the country MAC and carried out by representatives of the MAC, the QA, and an ex-pat Technical Advisor, observed by a representative from the demining company. The report was made available and the following summarises its content.

The demining group appear to have been operating a three-man team with a one-man drill. Victim No.1 was cutting undergrowth, detecting and prodding, while Victim No.2 "controlled" him and the third team member rested.

The mined area was a "rectangular wooded area" next to a road. Vegetation was described as "sparse undergrowth" and "immature oaks". The ground was covered by fallen leaves and the earth below "saturated". Work had stopped after one hour on the day before because of rain. Work started at 09:00 on the day of the incident, when the rain stopped. Three teams were working at the site with three separate Control Points. The Control Point for the accident team was not correctly marked and there was no "safe route" marked between it and the start point.

A QA monitor was on the site at all times.

When work started a dog handler and dog searched the accident area - 2 x 9 meter lane - for in between ten and fifteen minutes. A change of wind direction and the presence of cut undergrowth in the lane led the handler to search the lane from both ends. The dog did not signal but the handler later claimed to have warned the victim that the behaviour of the dog had changed so he should be careful.

The victim then started to search the lane with his metal detector. Victim no.2 was standing about 25 metres from his partner. When the accident occurred, Victim No.1 was not holding his detector. When the changeover of the team members was ordered, the police allowed movement of traffic on the adjacent road.

At 9:30 a PROM-1 exploded "close to the centre of the base line". The investigators decided that Victim no.1 stepped on the mine with his left foot and he was thrown to his left into the cleared area. His partner was on his knees leaning forward to pick up equipment and was facing away from the accident.

Victim No.2 had sustained fragment wounds to his "left foot and back". Victim No.1 was "very seriously injured". Medics attended them and they arrived at Tuzla hospital within 25 minutes of the detonation. The Team Leader stated that Victim No.1 yelled that his leg was injured. The third member of the team searched around the deminer.

The QA monitor claimed that the victim was seen searching the full width of the lane with his detector. When it was demonstrated to him that he could not see the victim from his position at the time, he changed his statement. He said that the amount of brushwood in the lane had been reduced, so it was possible that Victim No.1 had thrown some aside.

The group used the end-of-lane marking stick to detect tripwires, then cut the vegetation over the entire width and searches with a metal detector. There was very little vegetation in the search area, but there was a carpet of wet leaves. The investigators decided that Victim No.1 had missed an area with his detector and failed to locate the mine. They thought that the visual identification of other mines in the area may have given him a false sense of security.

A mine dog had searched the area 15 minutes before the accident.

The detector in use was a Schiebel AN 19/2. It was damaged and inoperative after the accident. Its batteries were checked and found to be "operative".

The investigators examined the protective helmet, visors and frag-jackets of the victim and found them "in good condition and undamaged".

The contract held by the demining company allowed them to claim full pay for any time when inclement weather prevented work, so they were not under pressure to hurry.

The mine was identified by its base plate. Fragments of tripwire were found but the investigators decided that it was unlikely to have initiated the mine.

The Team Leader thought that the excess water prevented the dog locating the mine.

Conclusion

The investigators decided that Victim No.1 probably believed the area was safe because it had been checked by the dog. They were "unable to draw any meaningful conclusions about the dog's performance on that day". They felt that Victim No.1 was "not sufficiently systematic" in his detector search.

Recommendations

The investigators recommended that the deminers should adhere to the group's SOPs and not use end-of-lane markers as tripwire feelers, mark sites properly, mark the lane properly as manual demining advances in a lane [the group's approved SOPs did not require this], use detectors appropriately and discourage deminers "from believing that an area is 100% cleared because a mine-detection dog has been over it". They also recommended using a MAC approved detector.

The demining team involved were told to undergo a day retraining, and the demining company to revise their SOPs.

They recommended that Victim No.1 should receive 100% insurance…. the paragraph continued but had been excised… at DM 300,000, and that victim No.2 should have his condition monitored for six months to ensure complete recovery and that a "competent medical authority should decide whether … he has a claim for compensation under [the demining group's] insurance".

The head of the MAC (then UN controlled) issued a memo ordering that recommendations on compensation be excised from the report, but they were in the copy held on file.

Victim Report

Victim number:	285	**Name:**	**Name removed**
Age:		**Gender:**	Male
Status:	deminer	**Fit for work:**	not known
Compensation:	not made available	**Time to hospital:**	25 minutes
Protection issued:	Frag jacket	**Protection used:**	none
	Helmet		
	Short visor		

Summary of injuries:

AMPUTATION/LOSS

Leg Below knee

COMMENT

The victim's injuries were not detailed but were called "severe". See medical report.

Medical report

No field medic or hospital reports were on file and the investigators did not give any details of Victim No.1's injuries.

A verbal report from a Technical Advisor at the country MAC indicated that the mine was deeply buried and "stuck" in some way so that Victim No.1 escaped the full fragmentation effect. His leg was traumatically amputated below the knee.

Victim Report

Victim number:	286	**Name:**	**Name removed**
Age:		**Gender:**	Male
Status:	deminer	**Fit for work:**	presumed
Compensation:	not made available	**Time to hospital:**	25 minutes
Protection issued:	Frag jacket Helmet Short visor	**Protection used:**	not recorded

Summary of injuries:

INJURIES

minor Body

minor Foot

COMMENT

No medical report was made available.

Analysis

The primary cause of this accident is listed as a *"Field control inadequacy"* because the investigators determined that Victim No.1 did not use his detector adequately and his error was not corrected. The secondary cause is listed as *"Inadequate training"* because it seems likely that victim did not understand the need to use his detector correctly. The detector, while an old model, should have been readily capable of finding the large metal mine but may not have been in good working order. Why the group was using a detector that was incapable of finding the AP blast mines in the country was unexplained.

The report stated that the protective wear worn by both victims was undamaged, yet Victim No.2 was injured by fragments in the back at a distance of 25 meters, and Victim No.1 was so severely injured that he deserved 100% compensation. In other incidents with this mine the protection has been severely damaged by fragments. It seems likely that the protective equipment was not being worn by the victims.

Related papers

Other documents on file include a sketch map of the site, a detailed map, details of the detector test that show a 50% decline after two hours of battery use and crater analysis, the dog's "history", photographs of the site and statements of team members.

A copy of the insurance from "Aster International… Alexandria VA 22312" re "accidental death and dismemberment policy" raises questions over whether it provided adequate cover. The medical expenditure was limited to US$5k for any one person and included "Broad form Exclusion" - No coverage for worker's compensation or employers' liability.

"Coverage is provided for demining operations in Bosnia and Croatia per contract with the World Bank. Premium is $51,300 based on $5.4M contract revenue with World Bank…"

"Accidental Death and Disablement Continental Scale excluding disabilities paying less than 20% of the capital sum" Capital sum: DM300,000 - Premium DM 305 for "Deminers handling mines, defusing and exposure to mines".

Original BoI report

What follows is the original BoI report (edited for anonymity).

REPORT OF BOARD OF INQUIRY ON ACCIDENT 14 NOVEMBER 1997

18 November 1997

INTRODUCTION

1. A Board of Inquiry was convened on 15 November 1997 to investigate the circumstances in which two employees of [Demining group collaboration between one international company and two national companies] were injured during mine clearance operations in the Tuzla area on 14 November.
2. The Board was convened by the United Nations Mine Action Centre in accordance with the provisions of Section VI of the following contract ("the Contract") FED-CW-A007/97 – TZ dated 14 June 1997, between Emergency Landmine Clearance Project Implementation Unit, Ministry of spatial Planning and Environment, Federation of Bosnia and Herzegovina ("PIU") and [Demining group international company] of the USA.
3. The Board comprised:
    a. Chairman - UN MAC
    b. Member - Director, Federal PIU (15 November only)
    c. Member - Advisor, Federal Project Implementation Unit
    d. Member - Supervisor, Tuzla Region PIU (16 November only)

[Name excised], representing [Demining group] was present throughout the Board of Inquiry investigation.

In addition, two EOD specialists from the UN MAC were appointed to assist the Board by testing equipment and carrying out crater analysis and mine identification.

TERMS OF REFERENCE

4. A copy of the Board's Terms of Reference are attached at Annex A
5. At a meeting held at the UN MAC prior to the formal opening of the Board, it was agreed that paragraph 4 of the Terms of Reference should include an obligation on the Board to: "ascertain whether or not, commercial contract considerations may have contributed to the cause of the accident."

SEQUENCE, DOCUMENTATION AND PROCEDURES OF TASKING

6. [Demining group] had been correctly tasked by the PIU in accordance with the provisions of the Contract and had been provided with information on known minefields in the area by the UN MAC prior to the commencement of work.

GEOGRAPHY

7. The site at which [Demining group] were operating is a small rectangular wooded area immediately adjacent to the main Tuzla-Doboj road, centred at Grid Reference

BQ974375. It is five kilometres from [Demining group]'s Tuzla Region base and 22 kilometres from Tuzla.

8. The trees are mainly immature oaks with sparse undergrowth but the ground has a heavy carpet of fallen leaves.

9. The site is generally flat and below the level of the adjacent main road. It drains from a south-westerly direction towards a ditch immediately beside the road. At the time of the accident, the soil beneath the carpet of recently fallen leaves was saturated with water.

10. Work had stopped after only an hour on the previous day – Thursday - because of rain. Light rain had fallen during the night of Thursday / Friday and work had not commenced on the site on Friday 15 November until 0900 hrs because of rain.

PRIORITY OF TASK

11. Occupied houses are situated immediately adjacent to the south-west side of the site and the main Tuzla - Doboj road forms the north west boundary of the site. This road is a major communications route. During the past eighteen months, fatal casualties have occurred within the site, which local inhabitants have entered to gather firewood.

12. The Tuzla Canton specifically requested that this site should be cleared.

13. Under an earlier contract which ended in May 1997, [Demining group] had worked at the same site.

SITE LAYOUT AND MARKING

14. A plan of the site ("the Woods") is attached at Annex B showing the direction of clearance.

15. Three teams were operating at the Woods. Teams 1 and 8 operated in a single section of their allocated area of the site. Team 5 was split into two parties and worked in two sections of their allocated area of the site.

16. Since each team operated from a different part of the cultivated agricultural areas at either end of the Woods, there were 3 separate Control Points. The Control Point for Team 1 (the Team whose members were injured) was situated next to a haystack in a field adjacent to the main road. It was not marked in accordance with [Demining group]'s SOPs. It was stated that this was because the area was known to be mine free since:

    - Children used the field as a play area.
    - A hay crop had been cut and was stacked in the field.
    - [Demining group] had previous worked at the same site.

17. There was no staked/taped Access Route from the Control Point to the cleared area adjacent to the Start Point, although from the ground markings it was obvious that a single route was used between the Control Point and the Start Point.

18. Marking of the area between cleared and uncleared areas in the Woods was by use of 1 metre high red topped stakes at three metre intervals and with short red topped stakes at one metre intervals between the 1 metre stakes. Plastic tape was fixed between all the stakes.

SUPERVISION AND DISCIPLINE ON SITE

19. [Demining group] have eight teams working in the Sizje area. This includes five teams on a hill site ("the Hill") approximately 1½ kilometres from the Woods and three teams in the Woods. [Demining group]'s supervisory structure is as follows:

    Tuzla Region Manager

    Operations Officer (present at either the Hill or Woods site whilst operations are in progress)

    Deputy Operations Officer(responsibe for Woods and present at all times whilst operations are in progress)

    Team Leader

The on-site supervisor was the Deputy Operations Officer, [name excised].

PIU Representative. The Site Monitor, [name excised] had been with Team No. 1 since the beginning of the contract on 7 July. He is a qualified Geologist and was the Head of his Department at the University of Tuzla.

QUALITY ASSURANCE

20. Part of the Quality Assurance process is the presence at each site of Site Monitors employed by the Regional PIU. Each [Demining group] team has a PIU Site Monitor. The role of the Site Monitor is to ensure that the contractor carries out the work as agreed with the PIU, particularly with respect to working methods, safety and effectiveness.

COMMUNICATIONS

21. [Demining group]'s radio communications network is comprehensive and works well. Each team leader has a hand held VHF radio and at both the Woods and Hill are able to speak direct to all levels of Supervision including [Demining group]'s base at Koksara.

22. VHF radios are supplemented by vehicle-mounted HF radios. [Demining group] regional office is equipped with a base station and several PTT telephones.

MEDICAL

23. A properly equipped ambulance was present at both the Woods and Hill site on 14 November.

24. The No. 1 Team medic is a qualified medical general practitioner who immediately responded to the scene of the accident from his position at the Control Point, approximately 100 metres away. He had a full trauma medical kit and stretcher. Team medics from three other teams also provided assistance. Each had a full trauma medical kit.

PERSONALITIES INVOLVED

25. Team No. 1 sustained the accident. Their names are:
Team Leader
Medic
No. 1 Deminer sustained injuries.
No. 2 Deminer sustained minor injuries
No. 3 Deminer
Dog handler
Mine Detection Dog

EQUIPMENT AND TOOLS

26. Team No. 1 was equipped with standard demining hand-tools used for cutting vegetation in clearance lanes.

27. The metal detector was damaged during the explosion and was inoperative when tested. The batteries were operative. Metal detector used by the team was a Schiebel AN 19/2. See Metal Detector test report attached as Annex C.

DETAILS OF MINE INVOLVED

28. The mine involved was a PROM 1 Bounding Fragmentation mine. Probably activated by Deminer No. 1 stepping directly onto the mine with his left foot. See crater analysis at Annex D.

EVIDENCE OF RE-MINING

29. There was no evidence or suspicion of re-mining at any part of the task site.

DRESS & PERSONAL PROTECTIVE EQUIPMENT

30. Each member of Team No. 1 was equipped with a helmet and attached visor and a ballistic jacket. Both the injured deminers were wearing helmets / visors and ballistic jackets at the time of the explosion. Examination of these items of protective dress showed that they were in good condition and undamaged.

USE OF DOGS

31. A mine dog had searched the area where the accident occurred, approximately fifteen minutes before the explosion. [Name excised] is an experienced mine dog and had recently undergone continuation training. Details of Brenda's demining record are attached as Annex E.

32. The dog handler has worked with [the dog] since he completed his training at the end of December 1996. He has worked with [the dog] for the whole time since then. Both have worked with Team 1 since the start of the contract.

DETAILED ACCOUNT OF ACTIVITIES ON 14 NOVEMBER

33. The following account summarises the responses to questions by members of the Board, directed to members of Team 1, Supervisors and the Site Monitor. Written statements made by team members are at Annex F.

34. Commencement of Work. On Thursday 13 November, the teams had been able to work for approximately 1 hour only before having to stop because of rain. When the teams arrived at the Woods on the morning of Friday 15 November, light rain was falling. They remained in their vehicles on the side of the main Tuzla-Doboj road, which had been closed by the civil police at approximately 0800 hrs. By 0900hrs the rain had stopped and work had commenced.

35. Search by Dog. The Dog Handler and [dog] commenced a search of an area approximately two metres wide by nine metres deep ("the lane") adjacent to the area cleared by Team 1 earlier in the week. Because of the presence of previously cut brushwood approximately half way along the lane in the direction of clearance and a change of wind direction, the dog searched from two directions. Firstly from the Base Line to the brushwood and then from the cleared area to the right of the lane beyond the brushwood. Because of the presence of brushwood, the dog was unable to search the whole lane.

36. The dog did not indicate the presence of mines at any time during its search of the area, but the dog handler noticed a change of behaviour during part of the dog's search. When the dog and handler completed the search of the lane, they moved back towards the Control Point. The dog handler states that he warned the No. 1 Deminer, who had acted as his spotter, to be careful because of the change that he had observed in the behaviour in the dog.

37. The total time taken by the dog to clear the lane was between ten and fifteen minutes.

38. Manual Search. The No. 1 Deminer moved to the Start Point and commenced his search. Immediately prior to this time No. 1 Deminer was told by the Deputy Operations Manager to set his metal detector at maximum sensitivity. No. 2 Deminer states that the No. 1 cleared an area approximately 70 centimetres deep. No. 2 Deminer was standing approximately 25 metres to the right of the No. 1, at an ideal angle to judge the distance No. 1 moved from the Base Line. At the time of the explosion, the No. 1 Deminer was not holding his metal detector.

39. Thirty minutes after work had commenced, the No.1 and No. 2 Deminers were due to changeover. At such times, it was the practice for the civilian police and SFOR police to permit traffic to move in both directions past the Woods on the adjacent main road.

40. At 0930 hrs when the changeover was in progress, a PROM mine detonated close to the centre of the Base Line.

41. Moment of Explosion. At the moment of explosion, No. 1 Deminer was thrown to his right into the previously cleared area.

42. The No. 2 Deminer had bent down to pick up some mine tape and stakes and was facing away from the No. 1 Deminer.

43. The Deputy Operations Officer and the Site Monitor were on the main road, on the side opposite from the woods, walking from the direction of the Control Point, towards the clearance lane and a position on the road adjacent to the lane.

44. The Team Medic was at the Control Point.

45. The Team Leader and the No. 3 Deminer was between the Control Point and the lane, approximately 25 metres from the lane.

46. Immediate Action. Deminer No. 3 and the Team Medic reached the site of explosion first and applied first aid and stabilised the patient. Team Medics from other teams were summoned to assist.

47. Both the No.1 Deminer, who was very seriously injured and the No. 2 Deminer, who had sustained shrapnel wounds to his left foot and back, were evacuated by road in [Demining group]'s ambulance to the Tuzla main hospital. They arrived at the hospital within approximately twenty-five minutes of the explosion occurring.

COMMERCIAL CONTRACT CONSIDERATIONS

48. Supervisors at all levels were asked if they were given productivity targets to meet. All stated that they were not under any pressure to achieve particular levels of productivity and the Team Leader and Deputy Operations Officer appeared to be unaware of the level of daily and weekly productivity which would qualify for 100% payment by the PIU.

49. The Regional Manager stated that he is not under any pressure to achieve productivity targets and stated that he was only prepared to work at rates of productivity that would permit safe working practice.

50. The Regional Manager confirmed that in the event of having to stop work because of bad weather, after confirmation by the Regional PIU Supervisor, [Demining group] could claim full payment for each such day that work could not proceed due to bad weather.

COMMENTS BY THE BOARD

51. No. 2 Deminer. The only person close enough to the No. 1 Deminer to have been able to observe him working in the lane for the period of between ten and fifteen minutes prior to the explosion was the No. 2 Deminer. He has stated that the No. 1 Deminer moved approximately 70 centimetres into the lane from the Base Line. From his position 25 metres to the right of the No. 1 Deminer, it is unlikely that he could have seen if the No. 1 was searching across the whole width of the lane or not.

52. Site Monitor. When first questioned on 15 November, the Site Monitor stated that the No. 1 Deminer had cleared from the Base Line to the end of the lane using his metal detector and in accordance with [Demining group]'s SOPs. He said that the No. 1 Deminer would have cleared the two-metre wide lane in one-metre increments.

53. The Site Monitor was taken to the Woods on 17 November by two members of the Board and pointed out the positions he occupied on the road during the time both the dog and the No. 1 Deminer were searching the lane. He could not have seen whether or not the No. 1 was using his metal detector across the whole 2-metre width of the lane and stated that he is not sure if the No. 1 Deminer moved much beyond the Base Line. He says that there was less brushwood in the centre of the lane immediately after the explosion than there had been when the dog had been searching. It may therefore be possible that the No. 1 moved the brushwood and threw it into the cleared area to his right.

54. The Site Monitor stated that the three red-topped 1 metre wooden stakes positioned to the left and the two at the end of the lane were probably positioned after the accident. He cannot be sure if they were in position before the accident. If they were, the only person who could have positioned them was the No. 1 Deminer. Team Leader states that these stakes were placed prior to accident.

55. The Site Monitor's first statement should be disregarded, as it is likely he was saying what he believed should have happened, not what actually happened.

56. Team Leader. At the site, the Team Leader was asked if the red-topped, 1 metre wooden stakes and connecting yellow tape to the left and at the end of the clearance lane were in position immediately after the explosion. He replied that they were and said that they were not put in place after the explosion. He said the No. 1 Deminer had positioned the stakes. At no time had the Team Leader been in a position to observe the actions of the No. 1 Deminer.

57. No. 3 Deminer. The No. 3 Deminer described manual demining drills for a two-metre wide lane that had previously been searched by a dog. He stated that, after a visual search, the base-stick would be used to detect tripwires, then the entire width of the two-metre lane would be cleared of vegetation and searched with a metal detector.

58. Although this procedure is not in accordance with [Demining group] SOPs, the Team leader confirmed that it was correct.

SUMMARY

59. Three [Demining group] teams had worked at the Woods for a total of six days prior to the accident. During this time, Team No. 1 had located the following mines within the area cleared as shown:

    6 Nov 2 x PROM – area cleared on that day (8 hours) 300 square metres.

    12 Nov 4 x PMA-2 - area cleared on that day (8 hours) 450 square metres.

60. The PROM mines located on 6 Nov had been sighted visually from the main road. Their fuses were above the ground. This may have given the No. 1 Deminer a false sense of security, because he may have thought that any other PROM mines in the area would be sighted visually or located by the dog.

61. The dog did not alert during its search of the lane on 14 November but its behaviour changed. The dog handler states that he told the No. 1 Deminer to be careful during his manual clearance.

62. The No. 1 Deminer failed to locate a PROM mine located within the area that the No. 2 Deminer stated the No. 1 had cleared. Deminer No. 2 states that the No. 1 had between 10 and 15 minutes to search an area of less than 2 square metres, which apart from a carpet of leaves had very little vegetation on it.

63. The Site Monitor confirms that the No. 1 Deminer was told by the Deputy Operations Manager to set his metal detector at maximum sensitivity.

64. It is unlikely that the No. 1 Deminer cleared to the end of the lane. This makes his failure to locate a PROM mine difficult to explain. He probably did not use the metal detector methodically or as required by SOPs. He did not sweep the entire width of the two-metre lane. It is possible that he carried out a cursory sweep of the area immediately to his front and then moved forward to remove the cut brushwood. If so, this could account for the amount of time he was working and the absence of the brushwood immediately after the explosion. The mine should have been detected.

65. It is likely that on reaching the end of his work period, the No 1 Deminer turned around and walked back the few steps to the Base Line but moved slightly to his left, across an area that he had not previously swept with his mine detector. He activated the mine by the direct pressure of his left foot.

66. Crater analysis shows that the mine was buried in water saturated soil. Tests conducted in the crater with an FFE PROM mine showed that it could be located easily with a Schiebel metal detector at a depth of 220mm. The fragments of trip wire found near the crater are unlikely to have initiated the mine.

67. It is likely that the No. 1 Deminer activated the mine by the direct pressure of his left foot as he walked out of the clearance lane.

68. All actions after the explosion were carried out correctly. The casualties were properly treated and promptly evacuated to hospital.

69. [Demining group]'s structure of supervision at the Woods was entirely adequate.

70. The protective equipment issued to [Demining group] staff is suitable for use in demining operations.

71. Metal detectors tested at the task site were all in good condition and were capable of finding a buried PROM mine. Although [Demining group] have UN MAC approved Guartel MD-8 metal detectors, they were not used at this site.

CONCLUSIONS

72. Deminer No. 1 probably believed that the area was clear because a dog had been over it. Although the dog did not fully indicate on the mine, the board are unable to draw any meaningful conclusions about the dog's performance on that day. Although the ground was wet and muddy, conditions were not bad enough to make manual clearance drills unsafe.

73. The No. 1 Deminer probably used his metal detector over an area approximately 1 metre deep by 2 metres wide. He failed to locate the mine because he was not sufficiently systematic in his search. If he had carried out his clearance drills in accordance with [Demining group] SOPs, he would have located the mine.

74. There is no evidence that team 1 was under pressure to achieve any productivity target.

RECOMMENDATIONS

75. [Demining group] demining teams should adhere to all aspects of their SOPs. The following points should be particularly addressed.

    - Base-sticks should not be used as tripwire feelers.
    - Marking of areas and lanes at the site should be in accordance with SOPs.
    - Lane marking should ensure that no-one walks over an area until it has been confirmed as cleared.
    - A manual deminer working in a clearance lane should mark the lane as he moves forward. – The responsibility to position stakes and marking tape should not be left to the No. 2 deminer.
    - Metal detector drills.
    - Drills for use in one-metre wide manual demining lanes.

[Demining group] should amend their SOPs to include use of the base-stick in accordance with MAC Technical Guidelines.

Deminers should be discouraged from believing that an area is 100% cleared because a mine-detection dog has been over it.

Consideration should be given to the use of metal detectors approved by UN MAC.

ADMINISTRATIVE PROCEDURES

76. The Board of Inquiry recommends that [Demining group] updates their Standing Operational Procedures and that these are passed to UN MAC for review.

77. The team involved in this accident should undergo a minimum of one days retraining.

DISCIPLINARY PROCEDURES

78. No disciplinary procedures are recommended.

COMPENSATION

[Victim No.1], the seriously injured No. 1 Deminer should receive the full amount of any insurance compensation payment made by the insurance company to [Demining group]. This should be paid regardless of anyone's responsibility for any part of the accident.

The PIU should arrange that [Victim No.2]'s medical condition be reviewed in 6 months. In order to establish whether he has a claim for compensation under the terms of [Demining group]'s insurance.

Signed:

Adviser Fed PIU

Director Fed PIU

Supervisor, Tuzla Regional PIU

UN MAC

Annexes: (not made available)
Annex A – Terms of Reference.
Annex B – Sketch map of site.
Annex C – Details of detector test.
Annex D – Details of crater analysis.
Annex E – Mine-Detecting Dog's history.
Annex F – Statements of team members.
Annex G – Photographs of site.